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14. ABSTRACT The part; a pump-housing made of 304 Stainless Steel weighing 37,000 lbs., taking approx. 1400-1500 hrs. to machine complete. To be awarded the contract for (4) housings, pricing had to be competitive. Creative machining methods had to be developed and utilized. One problem area was an operation to put (24) 4.25"- 6 threaded holes x 10 inches deep. Other advanced machining methods and techniques were required to reduce the total machine time of the entire component. NCDMM was requested to review current processes against current mfg technologies and recommend tooling and process changes					
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CVN-21 Carrier Casing

NCDMM Project No. 03-0001-06

PROBLEM / OBJECTIVE

The part; a pump-housing made of 304 Stainless Steel weighing 37,000 lbs., taking approx. 1400-1500 hrs. to machine complete. To be awarded the contract for (4) housings, pricing had to be competitive. Creative machining methods had to be developed and utilized. One problem area was an operation to put (24) 4.25" - 6 threaded holes x 10 inches deep. Other advanced machining methods and techniques were required to reduce the total machine time of the entire component.



Similar flange component
w/ recommended tooling

ACCOMPLISHMENTS / PAYOFF

Process Improvement

Applied newer drilling technology and eliminated the need to bore the holes to the minor diameter. By drilling and finishing the hole to size in one operation the customer was able to eliminate the need for four tools. The roughing and finish tapping of the 4.25" - 6 threads was then eliminated by using a thread mill with new programming methods.

Advanced programming techniques were also utilized to eliminate the re-cutting of chips. This helped to increase tool life. The new process reduced customer's machine time from 7 hours per hole to 45 minutes. That is an improvement of 900%.

Other major time reducing methods involved changing certain turning operations to Z-axis milling and helical / circle interpolation operations. This reduced the number of set ups which is a major

factor on a part this size. With the implementation of the above milling techniques, actual machining time went from 360 hours to approx. 51 hours. An improvement of 700%

Implementation and Technology Transfer

The project was implemented with the following achievements:

- Increased hole quality
- Reduced tool usage
- Improved thread finish
- Reduced set up time
- Increased MRR rate

PROJECT RESULTS

NCDMM Funded Effort		\$20K
Manufacturing Cost Savings* resulting from productivity gains, reduction in scrap, improved quality, and extended operational life.		\$1.2M
RETURN ON INVESTMENT (ROI)		60:1
<p><i>*Based on improved manufacturing process development, application of state-of-the-market tooling technology, re-calibration of machine tool to improve machining accuracy and elimination of successive relocation and repeated set-ups of the 37,000-pound workpiece. Savings over (4) workpieces.</i></p>		

TIME LINE / MILESTONE

Start Date June 03
End Date August 03

For additional information concerning this project, contact the NCDMM at www.ncdmm.org